

## BACKGROUND OF THE INVENTION

1. Field of The Invention

The present invention relates to plastic identifier tags, such as ear tags used for cattle identification, and processes for their manufacturer.

## 2. Background Information

Custom-imprinted plastic tags are used in a variety of contexts to identify and/or track items or commodities. This is particularly true in the cattle industry where plastic "ear tags" are used to distinguish cattle of one herd or group from those of others. Merely differentiating the colors of plastic ear tags is not sufficient to adequately identify ownership of cattle, in part, because there are insufficient tag colors available to provide unique identifiers for each owner's cattle, even, for example, in the context of one, large cattle handling facility. Therefore, uniquely identifying indicia (numerals, letters, and/or logos) are printed on plastic tag blanks.

The most cost-effective process for printing plastic ear tag blanks has heretofore involved "hot stamping" images

1           through the use of thermal film ("hot stamp foil"). Using  
2           this process, a sufficiently heated, metallic stamp block  
3           exhibiting a raised character (a numeral or letter, for  
4           example) is pressed against a plastic tag blank with a segment  
5           of hot stamp foil positioned therebetween. The thermal "ink"  
6           from the hot stamp foil which overlies the raised character on  
7           the stamp block is transferred to and thermally welded onto  
8           the plastic tag blank.

9           The hot stamping process has worked well for a number of  
10          years, but has certain drawbacks. As already mentioned, hot  
11          stamping involves having metallic stamp blocks with raised  
12          indicia for transferring the desired images to tag blanks.  
13          This, in turn, eliminates any degree of flexibility and  
14          spontaneity in choosing and printing images on tag blanks,  
15          particularly custom logos, etc. If a custom design is to be  
16          printed on a tag blank, a custom stamp block must be produced,  
17          often at significant expense relative to the cost of the other  
18          elements of tag production. In addition, in the case of  
19          producing individually numbered tags, stamp blocks must be  
20          changed for each successive tag blank which is hot stamped.

21          Because of the requirement for changing out stamp blocks  
22          as numbers or images are changed from one tag blank printing  
23          step to another, persons involved in printing plastic tag

1                   blanks are exposed to notable hazards as they manually remove  
2                   and replace the stamp blocks in close proximity to the  
3                   dangerously hot surfaces and components of the hot stamp  
4                   machines.

5                   Clearly, other methods for transferring images onto  
6                   plastic tag blanks would be faster, simpler, safer to workers,  
7                   and much more cost-effective. Such methods would include  
8                   traditional means by which letters and images are applied to  
9                   plastic surfaces and other industries. However, such  
10                  conventional methods do not produce images which are durable  
11                  enough to survive the typical environment in which plastic  
12                  identifier tags (cattle ear tags, for example) are used. To  
13                  date, no one has suggested or provided a method by which  
14                  plastic identifier tags may simply be "printed" in any faster,  
15                  cheaper, and safer manner than the conventional hot stamp  
16                  process, while still producing a suitably durable image.

17                  In view of the above, it would well serve the custom  
18                  imprinted plastic tag industry and its end users to provide an  
19                  improved process for printing plastic tag blanks, which  
20                  process obviates the use of heated metallic stamp blocks, yet  
21                  still applies indicia which is sufficiently durable to satisfy  
22                  the needs of end users. In addition to eliminating the use of  
23                  heated metallic stamp blocks with the associated cost and

worker hazards such a new process would also ideally provide substantially enhanced flexibility in choosing indicia which would be applied to plastic tag blanks and would involve a degree of simplicity of operation as to make practical the printing of plastic tag blanks by end-users (something which is practically prohibitive in view of equipment costs, difficulties for end users in acquiring needed stamp blocks, and user hazards as are all associated with conventional hot stamp machine technology).

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide an improved method for printing plastic identifier tags.

It is another object of the present invention to provide an improved method for printing plastic identifier tags, which method obviates the need for metallic stamp blocks (with indicia appearing in relief on a stamping face thereof) to impart images onto plastic tag blanks.

It is another object of the present invention to provide an improved method for printing plastic identifier tags, which method, when compared to conventional hot stamp printing processes, is more cost-effective, is safer for end users or tag vendor employees, and provides greater flexibility in

1 image selections, yet produces an end product with printed  
2 indicia of at least similar durability as that produced  
3 through conventional hot stamp processes.

4 It is another object of the present invention to provide  
5 an improved method for printing plastic identifier tags, which  
6 method facilitates substantially greater flexibility in  
7 choosing and printing images onto plastic tag blanks when  
8 compared to conventional hot stamp methods for printing such  
9 items.

10 It is another object of the present invention to provide  
11 a method for printing plastic identifier tags, which method  
12 substantially reduces costs associated with printing custom  
13 images onto plastic tag blanks when compared to conventional  
14 hot stamp methods for printing such items.

15 In satisfaction of these and related objectives, the  
16 present invention provides an improved method and process for  
17 printing plastic tag blanks for producing plastic identifier  
18 tags (such as cattle ear tags). The present method eliminates  
19 the need for metallic print blocks and their associated cost,  
20 cumbersome exchange during image changes, hazards associated  
21 with their handling, and inflexibility of image selection and  
22 printing. The present method, in turn, affords substantial  
23 flexibility in image selection and printing, is extremely

1 cost-effective, and is of a simplicity which will facilitate  
2 tag printing at an end user level.

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4 BRIEF DESCRIPTION OF THE DRAWINGS

5 Figure 1 is a perspective view of the preferred  
6 embodiment of the present invention.

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8 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

9 Imprinted plastic tags for identifying property (plastic  
10 ear tags for cattle, for example) are well-known. These tags  
11 are today typically made of polyurethane and are available  
12 from a number of suppliers, the supplier presently with the  
13 greatest market share being Temple Tag, Inc. of Little River,  
14 Texas. The present method involves use of conventional  
15 plastic ear tag blanks, and in no way requires changes to such  
16 substrate.

17 Clearly, printing a plastic tag blank with a conventional  
18 computer ink jet printer would in no way provide a  
19 sufficiently durable image for end-use. However, the current  
20 inventors have discovered that just such an image can be  
21 "welded" to the plastic tag blank in such a way as to produce  
22 an exceptionally durable image.

1                   The present inventors have discovered that one may "weld"  
2                   an ink jet printed image onto a plastic tag blank by first  
3                   placing polyester film (72 gauge/19 microns for the preferred  
4                   mode of the present process) over the printed image.   The  
5                   polyester film is, in the preferred mode of the present  
6                   process, in the form of an elongate strip which will pass  
7                   linearly through a processing machine as sequential tags are  
8                   processed and serves as a carrier to move processed tags from  
9                   the machine to a collecting bin.

10                  To the juxtaposed polyester film and printed plastic tag  
11                  blank is pressed a heated platen.   The preferred mode of the  
12                  present process involves using an aluminum platen which is  
13                  coated with a .125 thick, 60 durometer silicone coating.   The  
14                  coated platen is to be heated to between 350°F and 400°F and  
15                  pressed against the film/tag pairing using approximately 20  
16                  pounds of pressure.

17                  The present inventors have discovered that the described  
18                  process melts a small amount of a plastic tag's polyurethane  
19                  material.   This small portion of polyurethane (trapped by the  
20                  overlying polyester film) disperses over the surface of the  
21                  tag, including that portion with the ink jet-printed image.  
22                  After heat and pressure is removed, this dispersed  
23                  polyurethane solidifies as a substantially impermeable coating

1 over the printed image, thereby rendering the image virtually  
2 as durable as the plastic tag member itself.

3 The ability to print images on plastic tag blanks affords  
4 numerous advantages over conventional hot stamp tag printing  
5 processes. As will be evident to anyone who uses a computer  
6 and ink jet printer (or any other type of computer, graphics-  
7 capable printer) to any typical degree, one may design and  
8 print limitless image variations using a computer and ink jet  
9 printer combination. In addition, any number of software  
10 packages will provide for printing of sequential numbers or  
11 letters, and even bar codes. Therefore, anything that can be  
12 readily printed with a computer and attached the jet printer  
13 can now quickly and easily be applied to a plastic tag blank.

14 The present method obviates the need for custom produced  
15 metallic print blocks and in during the associated delays in  
16 being able to print custom images. Because changing numbers,  
17 letters, images, etc. merely involves changing that which the  
18 computer sends to the printer, vendor workers and end users  
19 need never so closely handle dangerously heated components as  
20 is necessary when changing images in association with a  
21 conventional hot stamp process.

22 Because end users of plastic tags (cattle ranchers and  
23 feed lot operators, for example) can be provided user-friendly

1 software packages for printing their tags, along with (if  
2 desired) pre-loaded image files with the end-users' custom  
3 logos, etc., end-user use of the present process for printing  
4 plastic identification tags is highly feasible and will be  
5 viable from a cost standpoint.

6 Clearly, the conventional ink jet printer will not, in  
7 its original, retail form, have suitable carriers for holding  
8 plastic tag blanks during their printing. However,  
9 modifications of existing printers for permitting the printing  
10 of nonstandard media is well within the knowledge and skill  
11 sets of computer hardware modifiers, and need not be detailed  
12 here as to provide an enabling disclosure. Once suitable  
13 carriers are provided for the jet printers selected for use  
14 with the present process, printing proceeds substantially as  
15 if mere paper sheets were being printed sequentially with  
16 desired images thereon.

17 Also evident is the fact that devices used to apply the  
18 heat and pressure to the juxtaposed tag blank and plastic film  
19 pairing can be of a wide range of complexity and automation.  
20 In theory (if not in practicality) one could practice the  
21 present method through use of a conventional clothing iron.  
22 However, it is envisioned that some degree of automation and  
23 custom-designed machinery will be desirable. Such machinery

1 must merely include a sufficiently heated flat surface of  
2 dimensions sufficient to fully cover the printed portion of a  
3 printed tag blank and some mechanism for pressing the heated  
4 surface against the juxtaposed pairing of printed tag blank  
5 and plastic film. More elaborate mechanisms may include  
6 automated advancing of plastic film which is fed from a reel  
7 and after heat sealing is advanced beyond the sealing position  
8 to carry completed tags to collecting bins. In any event, the  
9 machinery used to carry out the present method is not part of  
10 the present invention (although such may be the subject of a  
11 later, continuation-in-part patent application). Rather the  
12 invention, at present, is of the method which, at its heart,  
13 involves heat sealing, or "welding," printer-deposited images  
14 (whether of ink or suitable paint) onto plastic tag blanks  
15 using a heated surface which is pressed onto the plastic tag  
16 blank with an intervening film, the film serving to entrap and  
17 force the redepositing of the melted plastic material to form  
18 an encapsulated shield which will protect the printed image  
19 after processing.

20       Although the invention has been described with reference  
21 to specific embodiments, this description is not meant to be  
22 construed in a limited sense. Various modifications of the  
23 disclosed embodiments, as well as alternative embodiments of

1 the inventions will become apparent to persons skilled in the  
2 art upon the reference to the description of the invention.  
3 It is, therefore, contemplated that the appended claims will  
4 cover such modifications that fall within the scope of the  
5 invention.

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